

B. The Office Action rejects claims 1-3, 7-10, 14 and 16-17 under 35 U.S.C. §102(b) as being anticipated by Braymen. The Office Action asserts that the claimed solid state power source coupled to the resonant cavity reads on laser 12 of Braymen. If applicable to the present claims, this rejection and assertion are respectfully traversed.

Claims 1 and 7 (and thus dependent claims 8-10) have been amended to further specify that the solid state power source is coupled to the resonant cavity to excite resonant oscillations in the resonant cavity. In contrast, laser 12 of Braymen does not excite resonant oscillation in resonant cavity 32 of Braymen.

Claim 2 was rewritten into independent form and amended to specify that the recited cable is a coaxial cable. Although the Office Action asserts that the claimed cable reads on 16 and 30 of Braymen, 16 and 30 of Braymen are not coaxial cables.

Claim 3 was rewritten into independent form without any change in scope. Although the Office Action asserts that the claimed tube through the resonant cavity is inherent (as if needed to keep sample 25 from leaking), a tube through a resonant cavity is not inherent. For example, common household microwave ovens have a resonant cavity into which we place food to be cooked, and there is no tube disposed through the resonant cavity. Many other microwave resonant cavities are commonly found without a tube disposed through the resonant cavity. Braymen does not disclose, teach or suggest a tube disposed through resonant cavity 32.

Method claim 14 and dependent claims 16 and 17 remain unamended. The Office Action asserts that “the reference [Braymen] meets all the claimed structure, and therefore inherently must be capable of this use [method claims 14 and 16-17] in the same manner as structure of the claims.” This assertion is respectfully traversed.

In particular, Braymen discloses that laser 12 (that is asserted to be the claimed solid state power source) focuses on material to be sampled 14 within ablation cell 20. For example, see Braymen, column 5, lines 36-37. Braymen does not disclose, teach or suggest “exciting the resonant cavity with signal power from a solid state power source to sustain the plasma in the gas” as specified in independent method claim 14, and dependent method claims 16 and 17 by reason of their dependency.

C. The Office Action rejects claims 1, 6 and 11 under 35 U.S.C. §102(b) as being anticipated by Akiyoshi. If applicable to the present claims, this rejection is respectfully traversed.

Claims 1, 6 and 11 (by virtue of dependence on claim 7) have been amended to further specify that the solid state power source is coupled to the resonant cavity to excite

resonant oscillations in the resonant cavity. In contrast, laser 401, 402 of Akiyoshi does not excite resonant oscillation in a resonant cavity. In fact, Akiyoshi does not disclose, teach or suggest a resonant cavity or that the solid state power source is coupled to the resonant cavity to excite resonant oscillations in the resonant cavity as specified by claims 1, 6 and 11.

D. The Office Action rejects claims 4-5, 11-12, 15 and 18-20 under 35 U.S.C. §103(a) as being unpatentable over Braymen. If applicable to the present claims, this rejection is respectfully traversed.

1. The Office Action fails to establish a *prima facie* case that claims 4-5, 11-12, 15 and 18-20 would have been obvious to a person of ordinary skill in the art. The United States Supreme Court established the basic rules for analyzing an invention's obviousness and articulated three factual inquiries to be made in an obviousness determination. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). This analysis requires a factual inquiry into (1) the scope and content of the prior art, (2) the differences between the prior art and the claimed subject matter, and (3) the level of skill of a person of ordinary skill in the art at the time the invention was made. The M.P.E.P. instructs that "examiners should apply the test for patentability under 35 U.S.C. §103 set forth in *Graham*." See M.P.E.P. 2141 through 2143.

The determination of obviousness under 35 U.S.C. §103(a) is a legal conclusion that must be based on factual evidence. *Burlington Indus., Inc. v. Quigg*, 822 F.2d 1581, 1584, 3 USPQ2d 1436, 1439 (Fed. Cir. 1987). The results of the factual inquires articulated in *Graham v. John Deere Co.* provide the factual evidence upon which the legal conclusion of obviousness is to be based. It is respectfully submitted that the Office Action fails to support a legal conclusion of obviousness with factual evidence. Assertions of Patent Office personnel do not constitute evidence.

The U.S. Patent and Trademark Office bears the initial burden of establishing that the claimed invention is *prima facie* obvious. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). M.P.E.P. 4142 instructs that the "examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness."

2. The Office Action fails to establish an adequate factual foundation for its assertion that "It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a power level that does not damage the cable, since it has been held that discovering an optimal value of a result effective variable involves only routine skill in the art. One would have been motivated to choose a power level for the

purpose of minimizing a possibility of damaging cable between the power source and the resonant cavity.”

The Office Action points to a section of Braymen that discloses a type of fiber capable of carrying high power laser light if the power density applied to the head end of the fiber optic cable does not exceed “ 10^8 watts/cm²/sec.” Braymen discloses that exceeding this power density will damage the fiber (see column 5, lines 31-32). However, according to Braymen, the laser light stays in ablation cell 20, and it is ablated sample 25 of material to sample 14 that is transported out of ablation cell 20 into resonant cavity 32.

To establish a *prima facie* case of obviousness, the Patent and Trademark Office must demonstrate by substantial evidence that the prior art relied upon, coupled with the knowledge generally available in the art that the time of the invention, contains some suggestion or incentive that would have motivated an ordinarily skilled person to modify the subject matter of a reference or combine the subject matters of the references to achieve the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). M.P.E.P. 2143.01 instructs that “Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.”

The Office Action fails to establish factual evidence of any teaching or suggestion that a “solid state power source couples into the resonant cavity a power level to sustain a plasma in a gas disposed within the resonant cavity” as specified in claims 4-5, 11-12 and 18-20. Braymen does not couple any power from laser 12 into resonant cavity 32. Certainly Braymen provides no evidence that the power level should be less than 300 watts. Moreover, the Office Action fails to establish or even assert factual evidence of any teaching or suggestion that “the plasma constitutes a fluctuating load on the solid state power source” or that the power level is substantially stable with respect to the fluctuating load” as specified in claims 4-5, 11-12.

Establishment of a suggestion or incentive to modify or combine prior art references requires substantial evidence of such suggestion or incentive. The factual question of motivation is material to patentability, and it cannot be resolved on a subjective belief of unknown authority. Office Action assertions of such suggestion or motivation, without a prior art reference as support, is merely subjective belief and is insufficient to constitute substantial evidence upon which a legal conclusion can be based. Substitution of common

knowledge and common sense for a factual finding of motivation is nothing more than a conclusionary statement that does not fulfill the Patent and Trademark Office's obligation to set forth reasoned findings. *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002).

3. The Office Action further asserts that "It is further noted that the reference [Brayman] meets all the claimed structure as set forth in support of the manner of using the device, and therefore inherently must be capable of this use in the same manner as structure of the claims." This assertion is respectively traversed.

"The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)." See M.P.E.P., section 2143.01, page 2100-98, Rev. 1, Feb. 2000, 7th Ed (emphasis in the original).

Furthermore, not only does Braymen lack any suggestion to limit the power source to any particular power level, such modification would not even be attempted as it would be counter to the needs of the Braymen device to transport as much laser signal power as possible to ablation cell 20 in order to ablate material 14 and produce sample 25. "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)." See M.P.E.P., section 2143.01, page 2100-99, Rev. 1, Feb. 2000, 7th Ed (emphasis in the original).

CONCLUSION

In view of the present amendments and remarks, withdrawal of the rejection of claims 1-20 is earnestly solicited. It is respectfully submitted that the present application is in condition for allowance. Prompt reconsideration and allowance of the application are earnestly solicited. Should the examiner believe that any further action is necessary to place the application in condition for allowance, the examiner is invited to contact the undersigned applicant representative at the telephone number listed below.

The Commissioner is hereby authorized to charge any fees (or credit any overpayment) associated with this communication to Deposit Account No. 50-1078.

Respectfully submitted,

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APPENDIX A

In this appendix, as required under 37 C.F.R. 1.121(c)(1)(i), is a clean version of the claims as amended without markings to indicate the changes that have been made, and with parenthetical expressions to indicate the status of the claim as amended or newly added.

1. (Amended) A gas plasma emission source comprising:

a resonant cavity; and

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity.

2. (Amended) A gas plasma emission source comprising:

a resonant cavity;

a solid state power source coupled to the resonant cavity; and

a coaxial cable coupled between the solid state power source and the resonant cavity.

3. (Amended) A gas plasma emission source comprising:

a resonant cavity; and

a solid state power source coupled to the resonant cavity, wherein the resonant cavity includes a tube disposed through the resonant cavity.

4. (Amended) A gas plasma emission source comprising a resonant cavity and a solid state power source coupled to the resonant cavity, wherein:

the solid state power source couples into the resonant cavity a power level to sustain a plasma in a gas disposed within the resonant cavity, the power level being less than 300 watts;

the plasma constitutes a fluctuating load on the solid state power source; and

the power level is substantially stable with respect to the fluctuating load.

5. (Amended) The emission source of claim 4, wherein the power level is less than

100 watts.

6. (Amended) A gas plasma emission source comprising:

a resonant cavity; and

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity, wherein the solid state power source includes an oscillator coupled to a solid state power amplifier.

7. (Amended) An atomic emission detector comprising:

a resonant cavity;

*b1
end*
a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity; and

b2
a spectrographic detector disposed to sense atomic emissions from a gas within the resonant cavity.

11. (Amended) The detector of claim 7, wherein:

the solid state power source is coupled to the resonant cavity to provide a power level to sustain a plasma in the gas within the tube, the power level being less than 300 watts;

the plasma constitutes a fluctuating load on the solid state power source; and
the power level is substantially stable with respect to the fluctuating load.

12. (Amended) The detector of claim 11, wherein the power level is less than 100 watts.

18. (Amended) A method of using a solid state power source, comprising steps of:

b3
passing a gas through a resonant cavity; and
coupling a signal at a power level from an output of the solid state power source to sustain a plasma in the gas, the power level being less than 300 watts.

APPENDIX B

In this appendix, as required under 37 C.F.R. 1.121(c)(1)(ii), are the claims of the original specification which are marked up to show all the changes relative to the previous version of the claims. The changes are shown by brackets for deleted matter and underlining for added matter.

1. (Amended) A gas plasma emission source comprising:

a resonant cavity; and

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity.

2. (Amended) [The] A gas plasma emission source [of claim 1, further including] comprising:

a resonant cavity;

a solid state power source coupled to the resonant cavity; and

a coaxial cable coupled between the solid state power source and the resonant cavity.

3. (Amended) [The] A gas plasma emission source [of claim 1] comprising:

a resonant cavity; and

a solid state power source coupled to the resonant cavity, wherein the resonant cavity includes a tube disposed through the resonant cavity.

4. (Amended) [The] A gas plasma emission source [of claim 1] comprising a resonant cavity and a solid state power source coupled to the resonant cavity, wherein:

the solid state power source couples into the resonant cavity [sufficient] a power level to sustain a plasma in a gas disposed within the resonant cavity, the [sufficient] power level being less than 300 watts;

the plasma constitutes a fluctuating load on the solid state power source; and

the [sufficient] power level is substantially stable with respect to the fluctuating load.

5. (Amended) The emission source of claim 4, wherein the [sufficient] power level is less than 100 watts.

6. (Amended) [The] A gas plasma emission source [of claim 1] comprising:

a resonant cavity; and

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity, wherein the solid state power source includes an oscillator coupled to a solid state power amplifier.

7. (Amended) An atomic emission detector comprising: [the emission source of claim 1]

a resonant cavity;

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity; and

a spectrographic detector disposed to sense atomic emissions from a gas within the resonant cavity.

11. (Amended) The detector of claim 7, wherein:

the solid state power source is coupled to the resonant cavity to provide a [sufficient] power level to sustain a plasma in the gas within the tube, the [sufficient] power level being less than 300 watts;

the plasma constitutes a fluctuating load on the solid state power source; and

the [sufficient] power level is substantially stable with respect to the fluctuating load.

12. (Amended) The detector of claim 11, wherein the [sufficient] power level is less than 100 watts.

18. (Amended) A method of using a solid state power source, comprising steps of:

passing a gas through a resonant cavity; and

coupling a [sufficient] signal at a power level from an output of the solid state power source to sustain a plasma in the gas, the [sufficient] power level being less than 300 watts.